CLAIMS
METHOD FOR PROCESSING SULFIDE MINERALS AND CONCENTRATES.

1. The method of sulfide minerals and concentrates processing, which involves sulfide minerals oxidation in aqueous medium using nitrogen oxides, envisages that the sulfide materials containing slurry are subjected to oxidation of the sulfide and the oxidation is realized under controlled conditions of the slurry acidity, i.e. with constant neutralization of sulfuric acid formed as a result of the sulfides oxidation, moreover, sulfuric acid is neutralized to acidity level, at which no formation of elementary sulfur occurs, while natural or artificial substances, such as $CaCO_3$, $MgCO_3$, $Ca(OH)_2$, CaO, NaOH, $CaHPO_4$ etc., are used as acidity neutralizers; the choice of a specific neutralizer is dictated by the necessity of formation of slurry neutralization products with assigned physicochemical properties: filterability, slurry thickening, arsenic substance insolubility, non-toxicity and other required properties. Oxidation of sulfide minerals is realized under agitation providing sufficient mass exchange and efficient occurrence of chemical reactions. Oxidation is realized in the temperature range of 20-90°C, mainly in the range of 65-85°C. The required temperature is maintained by removal of heat released during sulfides oxidation from the oxidation reactors. The liquid-to-solid ratio may vary from 1:1 to 5:1, depending on the effectiveness of the required precipitate formation and proceeding of sulfide oxidation reactions. Nitric and nitrous acids, as well as their oxides, mainly nitrous acid, HNO_2, and its oxide, N_2O_3, are used as oxidizing agents in this patent application.

2. Air or oxygen is used for regeneration of nitrogen oxides from NO to N_2O_3.

3. Absorption of nitrogen oxides for their separation from the air inert nitrogen is realized by sulfuric acid solutions, their prevailing concentration 75-98%. Sulfuric acid denitration is realized both thermally by heating mainly to a

temperature not exceeding 250°C, and chemically, i.e. by introduction of denitrating substances, like alcohols, formaldehyde and other chemical reducing agents.

4. Absorption of nitrogen oxides for their separation from inert nitrogen in the air is realized in agreement, using monovalent copper salt solutions. Denitration of the monovalent copper salt solutions is realized by dosed supply of compressed air, possibly with simultaneous heating of the solution. Monovalent copper solutions may contain stabilizing agents impeding copper oxidation from monovalent to bivalent one, as bivalent copper solutions are not effective solvents of NO. The well-known substances, namely tributyl phosphate and adipodinitrile, as well as reducing agents like formaldehyde, hydrazine, etc. can be used as stabilizing agents.

5. Nitrogen oxide regeneration process involving NO oxidation by pure oxygen is realized at a temperature of 15-25°C in individual regeneration oxidizer, which permits converting NO into N_2O_3 and preventing nitric acid accumulation in the slurry.